(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
12 April 2001 (12.04.2001)

PCT

(10) International Publication Number
WO 01/24885 A2

(51) International Patent Classification[7]: A63B 21/012, 69/16

(21) International Application Number: PCT/IB00/01452

(22) International Filing Date:
29 September 2000 (29.09.2000)

(25) Filing Language: Italian

(26) Publication Language: English

(30) Priority Data:
VI99A000202 1 October 1999 (01.10.1999) IT

(71) Applicant *(for all designated States except US)*: **GIST SNC DI PAROLIN LUIGI E CAMILLO & C.** [IT/IT]; Via Ramon, 10, I-36028 Rossano Veneto (IT).

(71) Applicants and
(72) Inventors *(for CA, US only)*: **PERUZZO, Massimo** [IT/IT]; Via S. Pio X 44, I-36027 Rosà (IT). **PAROLIN, Gilberto** [IT/IT]; Via T. Zanon, 31, I-36028 Rossano Veneto (IT).

(74) Agent: **BONINI, Ercole**; Studio Ing. E. Bonini Srl, Corso Fogazzaro, 8, I-36100 Vicenza (IT).

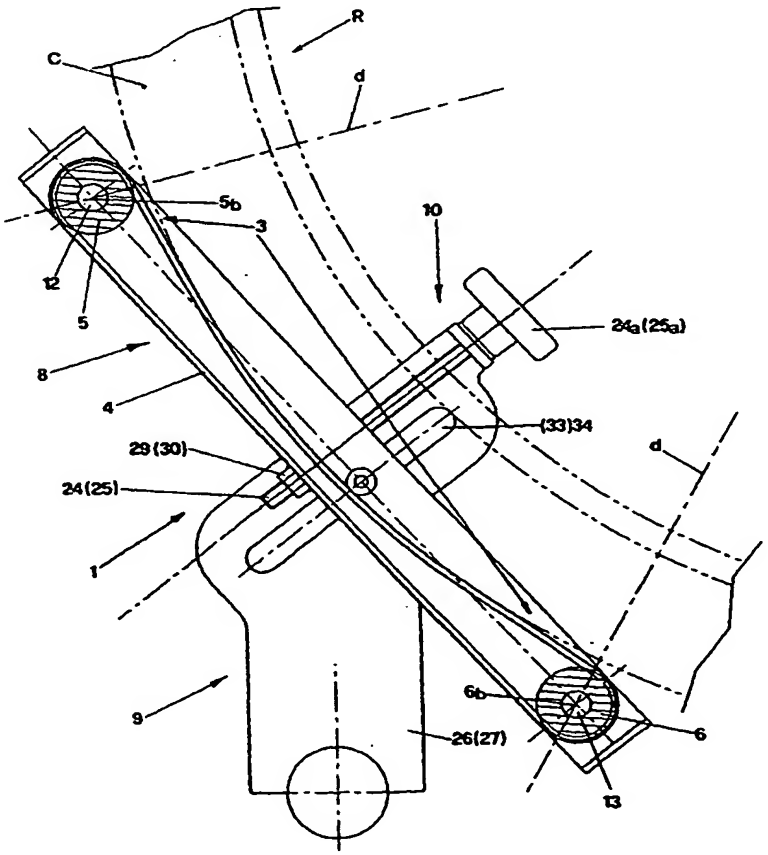
(81) Designated States *(national)*: AU, CA, US.

(84) Designated States *(regional)*: European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published:
— *Without international search report and to be republished upon receipt of that report.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: BRAKING UNIT FOR BICYCLES



(57) Abstract: Braking assembly (1) for bicycles (B) is disclosed, particularly suitable for training of cyclists, constrained to a support structure (2; F) and provided with braking means (3) cooperating with the driving wheel (R) of said bicycle (B) to generate a resisting torque opposing the rotation given by the cyclist to the driving wheel (R) through the pedals (P). The braking means (3) comprise a flexible belt (4) with mainly longitudinal development arranged with perimetral adherence to tyre (C) of the driving wheel (R) for at least a portion of its circumference and wound as a closed loop between at least a couple of revolving rollers (5, 6), one of said rollers being operatively connected to energy dissipation means (7).

WO 01/24885 A2

BRAKING UNIT FOR BICYCLES

The invention relates to a bicycle braking assembly to carry out training of cyclists.

It is known that cyclists wanting to train using their own bicycle, are using proper braking assemblies that are engaged with the driving wheel to obtain an adjustable resisting torque opposing its rotation carried out with the pedals.

More particularly the braking assemblies of known type are applied to braking stands used in gymnasia and generally in closed rooms, comprising a tripod supporting the bicycle which is arranged in a vertical position with the driving wheel raised from the ground and engaged with the braking means.

According to the state of the art devices, the braking assemblies comprise one or more rollers with a substantially horizontal axis contacting the tyre of the driving wheel and connected to an electromagnetic, hydraulic or mechanical brake provided with regulation means adapted to change the resisting torque.

The above mentioned braking assemblies however have some drawbacks.

A first drawback consists in that in use a friction is generated between the wheel and the braking rollers so that the tyre is quickly deteriorated.

Since primarily in racing bicycles the tyres are made of special materials and therefore are particularly expensive, this is clearly an unnecessary rise of costs for the user.

A further drawback consists in that in use a considerable noise is generated that sometimes cannot be tolerated for instance when the braking assembly is applied on braking stands used in gymnasia and generally in closed rooms.

Use of the above mentioned braking assemblies is particularly problematic when they are used with bicycles like mountain bikes provided with tyres having a tread with deep grooves.

In such a case in addition to the considerable wear of the tyre of the driving wheel and greater operation noise, annoying vibrations are also generated, that are transmitted to bicycle and cyclist who is obliged to pedal in uncomfortable conditions.

In an effort to remove such drawbacks, braking assemblies were made in which the braking rollers are contacted with the rim of the driving wheel instead of the tyre.

More particularly the braking assembly comprises a couple of opposed contrasting rollers that are holding a grip with the edge of the rim of the driving

wheel that is kept raised from the ground by a stand fixed to the hub.

The above mentioned braking assemblies with opposed rollers and related braking stands are actually solving the problem of noise and tyre wear and can be used both for racing bicycles and bicycles of mountain bike type.

However these assemblies have further drawbacks, one being the fact that braking assemblies with lateral rollers have costs that are considerably higher than the braking assemblies with rollers tangent to the wheel and this is due to their greater mechanical complexity.

A further drawback consists in that fitting the bicycle on the braking stand using said braking assemblies, is less easy and quick because it is necessary to use a particular device being part of the braking assembly, adapted to spread the contrasting rollers in order to place the wheel between the rollers.

Last but not least drawback consists in that a friction is generated between rim and rollers, obliging user to replace said rollers from time to time in order to keep the braking assembly always perfectly efficient.

The present invention aims to remove said drawbacks.

More particularly, a first object of the invention is a bicycle braking assembly that reduces considerably wear of the tyre of the driving wheel contacting the braking means in comparison with the braking assemblies of equivalent known type.

Another object of the invention is a braking assembly having an operation noise lower than the braking assemblies of equivalent known type.

A further object of the invention is a braking assembly inducing less vibrations in the bicycle in use.

Still a further object of the invention is a braking assembly of simpler construction and with more reliable operation in comparison with braking assemblies of known type available on the market and with corresponding performances.

These objects are attained by a bicycle braking assembly particularly suitable for training of cyclists, that according to the main claim is constrained to a support structure and is provided with braking means cooperating with the bicycle driving wheel so as to generate a resisting torque opposing the rotation applied by the cyclist to said driving wheel through the pedals and is characterized in that said braking means comprise at least a flexible belt with mainly longitudinal development arranged with a perimetral adherence to tyre

of said driving wheel for at least a portion of its circumference and wound as a closed loop between at least a couple of rotating rollers, at least one of said rollers being operatively connected to energy dissipation means.

According to a preferred embodiment the rotating rollers are belonging to a rigid frame supported by a support bracket which is constrained to the support structure.

The braking assembly is preferably used with a braking stand comprising a tripod supporting the bicycle at the hub of the driving wheel and keeping the bicycle in a vertical position with the driving wheel raised from the ground.

The tripod is the support structure to which the support bracket of the braking assembly is fixed.

Proper adjustment means of the screw and nut screw type allow to change the position of the rigid frame and consequently of the flexible belt in respect of the driving wheel so as to adjust the braking stand to the different size of the bicycles.

The couple of revolving rollers comprises a first roller with an internal grooved surface connected to energy dissipation means and a second roller with outer smooth surface, parallel to one another and revolving around fixed rotation axes of the rigid frame.

The energy dissipation means comprise a disc of amagnetic material, preferably aluminum, fixedly keyed to the first roller and arranged between a couple of magnetic pieces supported by a moveable fork that can be moved by actuating means in respect of the disc. Such actuating means comprise an operating lever fixed to the bicycle frame and driving a flexible wire that moves the fork so as to change the surface area of the magnetic pieces and of the facing disc.

According to a mentioned embodiment the braking assembly of the invention may be applied to a support stand of a bicycle arranged with the driving wheel raised from the ground, so as to obtain a braking stand allowing training of cyclists in gymnasium or in domestic rooms.

According to another embodiment, the braking assembly of the invention may be fixed to the bicycle frame so as to obtain braking of the driving wheel when the bicycle is running on the road.

The braking assembly of the invention advantageously shows a quieter operation and reduces tyre wear in view of the elastic contact between tyre

and belt.

The braking assembly of the invention is also more reliable than the braking assemblies of known type as it comprises a lower number of components.

The braking assembly of the invention has also a less expensive construction and requires less maintenance in respect of the braking assemblies of equivalent known type.

The foregoing objects and advantages will be better understood from the description of a preferred embodiment of the invention that is given as an illustrative non-limiting example with reference to the accompanying sheets of drawings in which:

- figure 1 is a side view of the braking assembly of the invention applied to a bicycle arranged in a fixed vertical position;
- figure 2 is a vertical sectional view of a detail of the braking assembly and bicycle of figure 1;
- figure 3 is a sectional view taken along line III-III of another detail of the braking assembly of figure 1;
- figure 4 is an outer view of the detail of figure 3;
- figure 5 is a sectional view along line V-V of a detail of the braking assembly of figure 1; and
- figure 6 is a view of a different application of the braking assembly of the invention.

The braking assembly of the invention shown in figure 1 is generally indicated with reference number 1. The braking assembly is constrained to a support structure comprising a support stand generally indicated with reference number 2 for a bicycle B.

The braking assembly 1 together with the support stand 2 constitutes therefore a static braking stand for the bicycle B, where the braking assembly generates a resisting torque opposing the rotation that the cyclist gives to the driving wheel R actuating the pedals P.

According to the invention and with particular reference to figures 2 and 3, the braking means 3 comprise a flexible belt 4 with a mainly longitudinal development arranged with a perimetral adherence to tyre C of the driving wheel R for at least a portion of its circumference and wound as a closed loop between a couple of revolving rollers 5, 6 one of which, more particularly the first revolving roller 5, is operatively connected to energy dissipation means

generally indicated with reference number 7.

The revolving rollers 5, 6 are part of a rigid frame generally indicated with 8 that can be seen also in figure 4, and define a couple of longitudinal rotation axes 5b, 6b parallel to one another.

The rigid frame 8 is supported by a support bracket generally indicated with 9 and steadily fixed to stand 2, to which the rigid frame 8 is connected through adjustment means generally indicated with 10 adapted to change the position in respect of the driving wheel R.

Proper blocking means 11 are fixing the rigid frame 8 in the desired position.

More particularly it can be seen in figure 3 that the rigid frame 8 comprises a couple of side members 8a, 8b parallel to one another that are rigidly connected through a couple of fixed pins 12, 13, each of them being the pivot pin of a corresponding roller 5, 6 with the intermediate arrangement of rolling bearings 12a, 12b and 13a, 13b respectively.

More particularly the first roller 5 has an outer surface provided with grooves 5a cooperating with corresponding grooves 4a made on the inner surface of the flexible belt 4 while the second roller 6 has an outer smooth surface.

As already mentioned, the first roller 5 is connected to energy dissipation means generally indicated with reference number 7 comprising a disc 14 preferably made of amagnetic material for instance aluminum, fixedly keyed to the first roller through a fly wheel 15 and a cooling fan 16 which is arranged between a couple of magnetic pieces 17a, 17b supported by a moveable fork 18 sliding along guide means 19 of a case 20 fixed to the rigid frame 8.

More particularly case 20 has a protective function as it is so shaped as to contain disc 14, fly wheel 15, fan 16 and fork 18 as shown in figure 3.

Fork 18 may slide longitudinally along the guide means 19 in both directions of arrow 21 being connected to actuating means 22 comprising a flexible metal wire 22a tensioned by an operating lever 22b fixed to the bicycle handlebar.

With regard to the adjustment means generally indicated with 10, it can be seen in figure 5 that said means comprise a couple of screws 24, 25, each of them being integral with a corresponding half bracket 26, 27 and being coupled to a nut-screw 29, 30 fixed to the rigid frame 8 at a corresponding side member 8a, 8b.

Each screw 24, 25 is arranged in through holes 8c, 8d made in each corresponding side member 8a, 8b and is provided at one end with a control

hand-wheel 24a, 25a.

As to the blocking means generally indicated with 11 shown in figures 3 and 4, it can be seen that said means comprise a couple of screws 31, 32 each protruding from the corresponding side member 8a, 8b of the rigid frame 8 and threaded in a corresponding slit 33, 34 shown in figures 2 and 3 and made in each half-bracket 26, 27 which is fixed through a nut-screw 35, 36 preferably made in a control handle 35a, 36a.

Locking is obtained by lock-nuts 37, 38.

The position of the rigid frame 8 is adjusted by acting on the adjustment means 10 so as to cause the flexible belt 4 to adhere to tyre C of the driving wheel R.

Then the rigid frame 8 is fixed in the adjustment position so obtained through the locking means 11, so that rollers 5, 6 as shown in figure 2 do not contact said wheel and their longitudinal axes 5b, 6b are arranged at the same distance d from hub M of the driving wheel R.

The cyclist starts pedalling and actuating the lever 23 causes the fork 18 to slide arranging it in any position comprised between the two end positions shown with continuous line and dashed line in figure 3 according to the desired resisting force.

Indeed the magnetic pieces 17a, 17b carry out a magnetic effect induced on the aluminum disc 14 braking the first roller 5 and therefore the belt 4 in proportion to the opposite surface areas of the magnetic pieces and the aluminum disc.

A different application of the braking assembly 1 of the invention is shown in figure 6 where the assembly is constrained to the back fork F of the frame of the bicycle B that in this case constitutes the support structure.

With this application solution the cyclist may perform a dynamic training running with the bicycle on the road.

From the foregoing description it is to be understood that elasticity of contact between tyre C and flexible belt 4 reduces wear of tyre C and makes operation of the bicycle less noisy.

More particularly noise and wear do not change when on the braking stand racing bicycles or bicycles like mountain bikes with grooved tyre are installed.

It is also to be pointed out that the limited number of components simplifies the mechanical construction and reduces the corresponding costs as well.

Moreover, as the pivot pins of the rollers driving the flexible belt are fixed, a

greater operation precision is allowed in comparison with the braking assemblies of known type in which on the contrary the pivot pins supporting the rollers are revolving pins.

Finally the braking assembly of the invention in both embodiments in which it is connected either to the stand supporting the bicycle B or to the back fork F of the bicycle frame, can be easily adjusted so as to regulate in an optimal way the adherence of the belt to the surface of the tyre of the driving wheel.

It is clear that modifications of structure and shape may be made in carrying out the braking assembly of the invention that should be covered by the present patent when falling in the scope of the appended claims.

CLAIMS

1) A braking assembly (1) for bicycles (B) particularly adapted for training of cyclists, constrained to a support structure (2; F) and provided with braking means (3) cooperating with the driving wheel (R) of said bicycle (B) to generate a resisting torque opposing the rotation applied by the cyclist to said driving wheel (R) through the pedals (P), **characterized in that** said braking means (3) comprise at least a flexible belt (4) with mainly longitudinal development arranged with perimetral adherence to tyre (C) of said driving wheel (R) for at least a portion of its circumference and wound as a closed loop between at least a couple of revolving rollers (5, 6), at least one of said rollers being operatively connected to energy dissipation means (7).

2) The braking assembly (1) according to claim 1) **characterized in that** said couple of revolving rollers (5, 6) is part of a rigid frame (8) supported by a support bracket (9) constrained to said support structure (2; F), said rigid frame (8) being connected to said support bracket (9) through adjustment means (10) adapted to change its position in respect of said tyre (C) of said driving wheel (R).

3) The braking assembly (1) according to claim 2) **characterized in that** said rigid frame (8) is connected to said support bracket (9) also through blocking means (11) adapted to fix said frame in the position defined by said adjustment means (10).

4) The braking assembly (1) according to claim 2) **characterized in that** said adjustment means (10) comprise at least a screw (24, 25) with control means (24a, 25a) integral with said support bracket (9), said screw being coupled with a nut-screw (29, 30) fixed to said rigid frame (8).

5) The braking assembly (1) according to claim 3) **characterized in that** said blocking means (11) comprise at least a screw (31, 32) protruding from said rigid frame (8) and threaded in a slit (33, 34) made in said support bracket (9) to which is fixed through a nut-screw (35, 36) with control handle (35a, 36a).

6) The braking assembly (1) according to claim 2) **characterized in that** said couple of revolving rollers comprises a first roller (5) operatively connected to said energy dissipation means (7) and a second roller (6), said flexible belt (4) being wound between said rollers, said rollers (5, 6) having substantially horizontal and parallel rotation axes (5b, 6b).

7) The braking assembly (1) according to claim 6) **characterized in that** said first roller (5) on its outer surface has grooves (5a) cooperating with corresponding grooves (4a) made on the inner surface of said flexible belt (4).

8) The braking assembly (1) according to claim 2) characterized in that said revolving rollers (5, 6) have the corresponding rotation axes (5b, 6b) arranged at the same distance (d) from the hub of said driving wheel (R) for any position in which said frame (8) places the flexible belt (4) adhering to said tyre (C).

9) The braking assembly (1) according to claim 2) **characterized in that** said rigid frame (8) comprises a couple of parallel side members (8a, 8b) rigidly connected to one another through a couple of fixed pins (12, 13) each of them being the pivot pin of a corresponding roller (5, 6).

10) The braking assembly (1) according to claim 6) **characterized in that** said energy dissipation means (7) comprise a disc (14) of amagnetic material fixedly keyed to said first roller (5) with the surface arranged between a couple of magnetic pieces (17a, 17b) supported by a moveable fork (18) integral with said rigid frame (8) and connected to actuating means (22) adapted to move said magnetic pieces (17a, 17b) in respect of said disc (14).

11) The braking assembly (1) according to claim 10) **characterized in that** said amagnetic disc (14) is connected to said first roller (5) through a fly wheel (15) with cooling fan (16), both coaxial with said first roller (5).

12) The braking assembly (1) according to claim 10) **characterized in that** said disc of amagnetic material (14) is arranged inside a case (20) fixed to said rigid frame (8) and provided with guide means (19) for sliding said moveable fork (18).

13) The braking assembly (1) according to claim 10) **characterized in that** said actuating means (22) comprise a flexible wire (22a) fixed at one end to said moveable fork (18) and at the opposite end to a control lever (22b) supported by the handlebar of said bicycle (B).

14) The braking assembly (1) according to claim 2) **characterized in that said** support bracket (9) consists of a couple of facing half brackets (26, 27) between which said rigid frame (8) is arranged.

15) The braking assembly (1) according to claim 14) **characterized in that** said support bracket (9) is fixed to a support stand (2) supporting said bicycle (B) arranging it in a vertical fixed position with the driving wheel (R)

raised from the ground (T).

16) The braking assembly (1) according to claim 15) **characterized in that** said support stand (2) supports said bicycle (B) at the hub (M) of the driving wheel (R).

17) The braking assembly (1) according to claim 14) **characterized in that** said support bracket (9) is fixed to the back fork (F) of the frame of said bicycle (B).

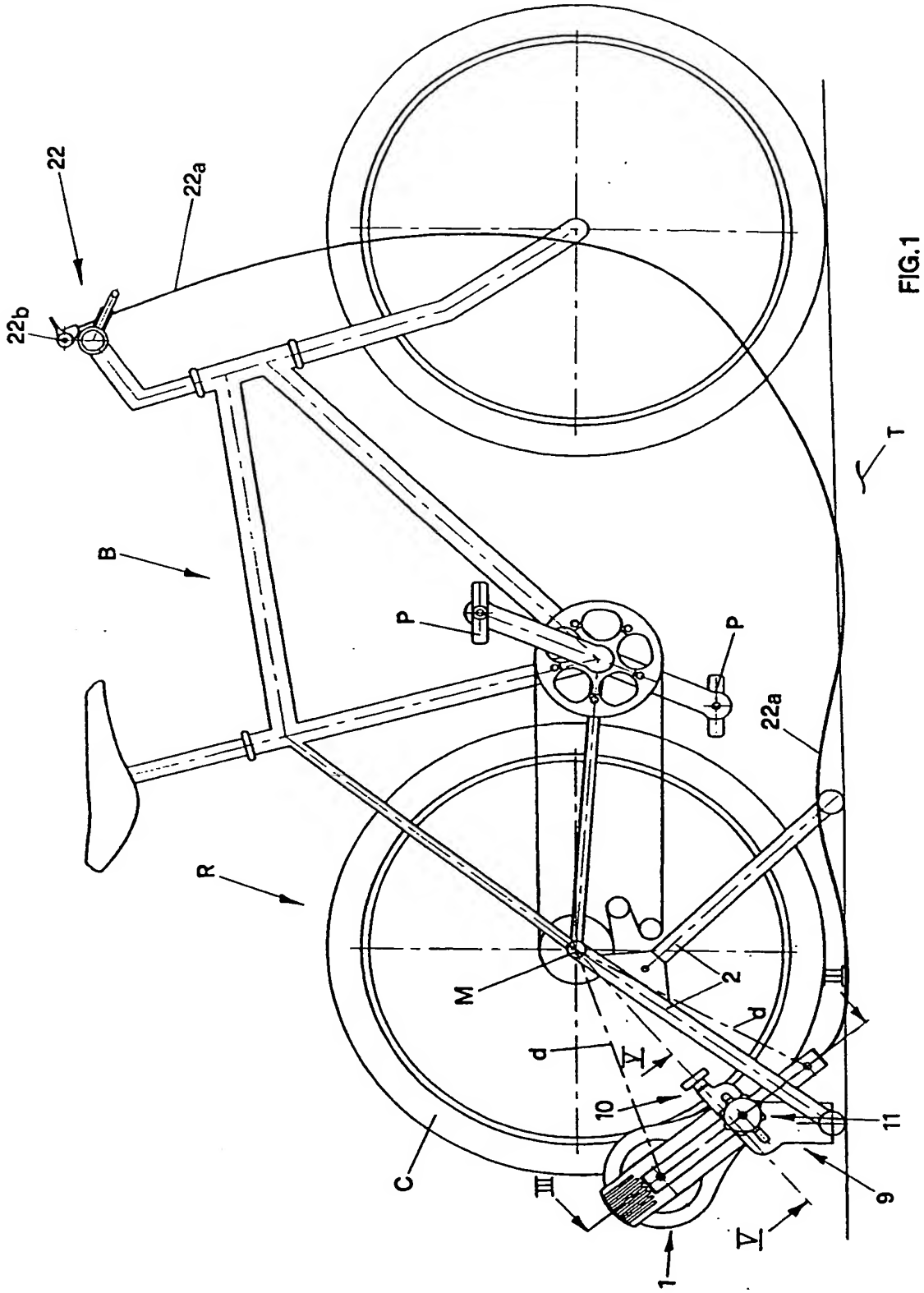


FIG.1

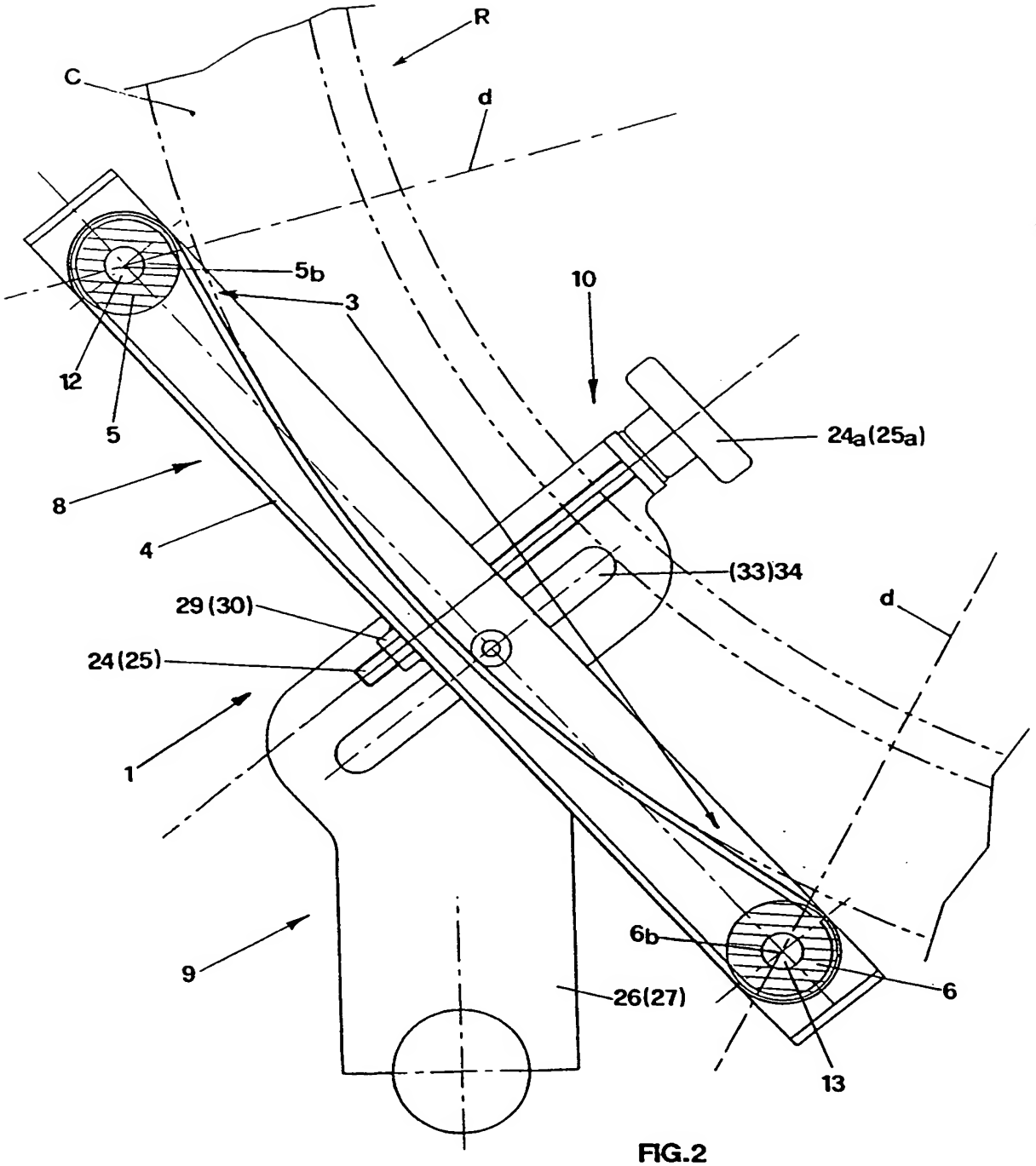


FIG.2

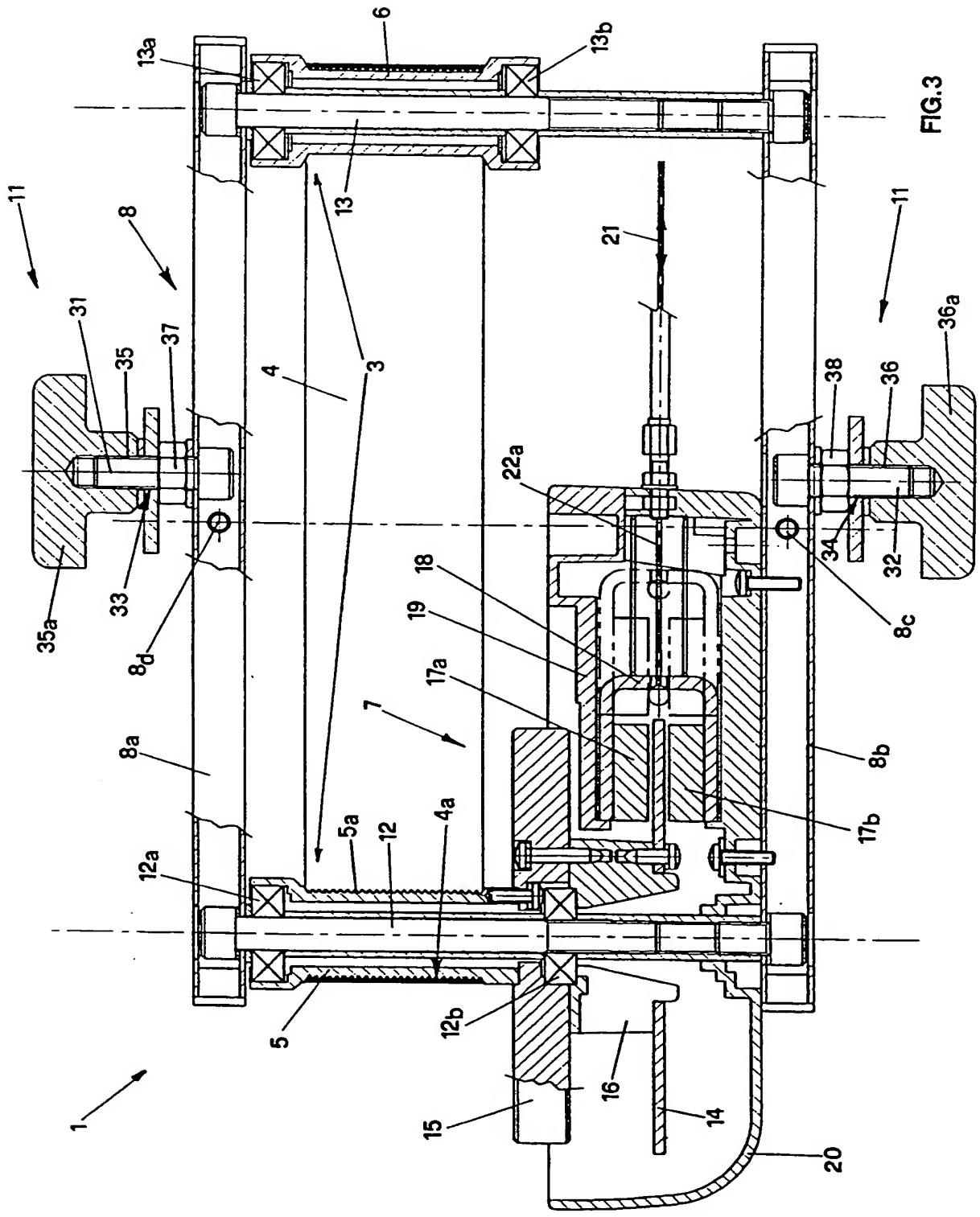

6
13a
13b
13
3
4
11
8
31
35
37
21
11
36a
38
36
22a
34
32
8c
35a
33
8d
18
19
17a
7
8a
8b
17b
5a
12
4a
12a
5
12b
16
15
14
20
1

FIG.3

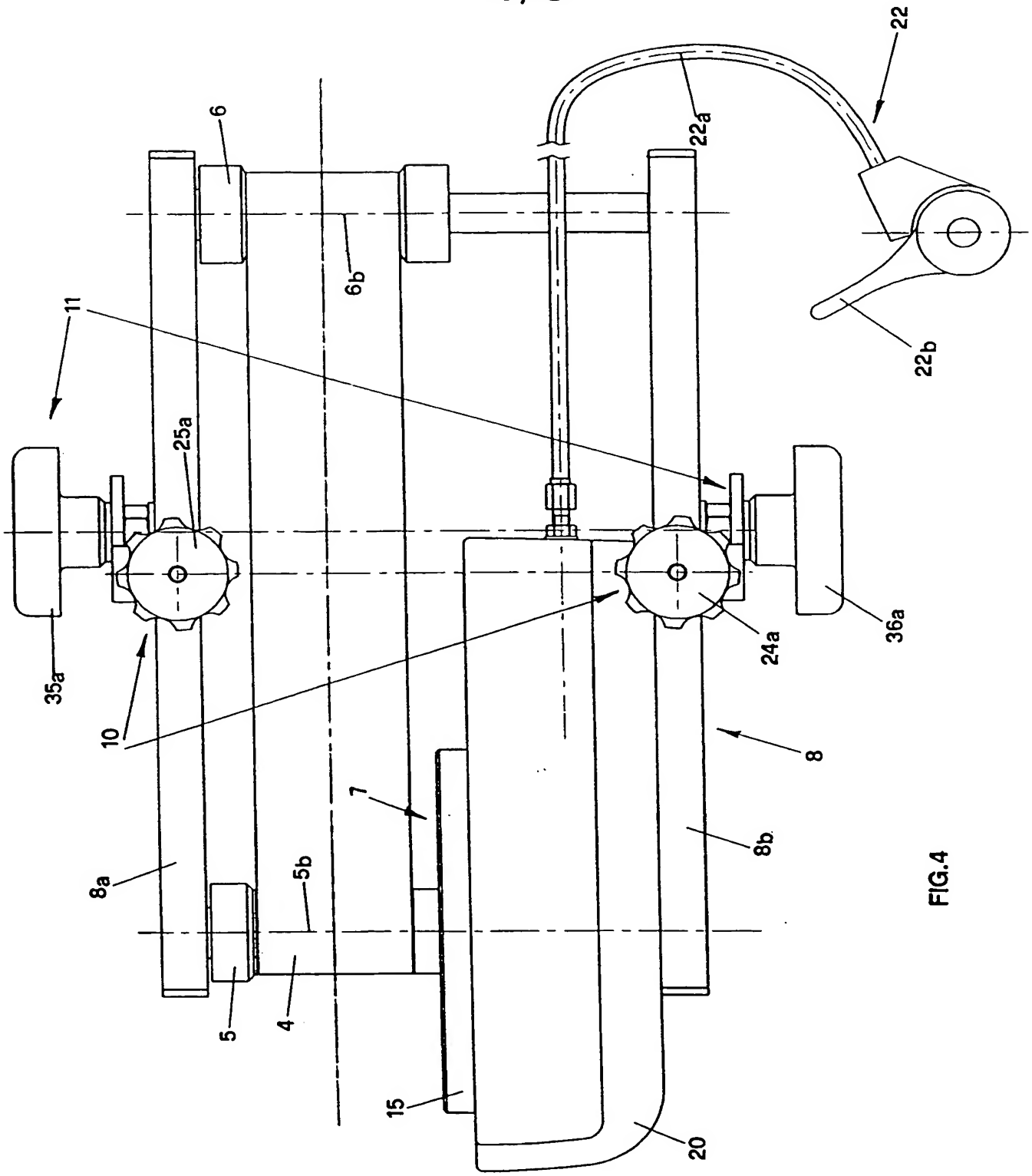


FIG.4

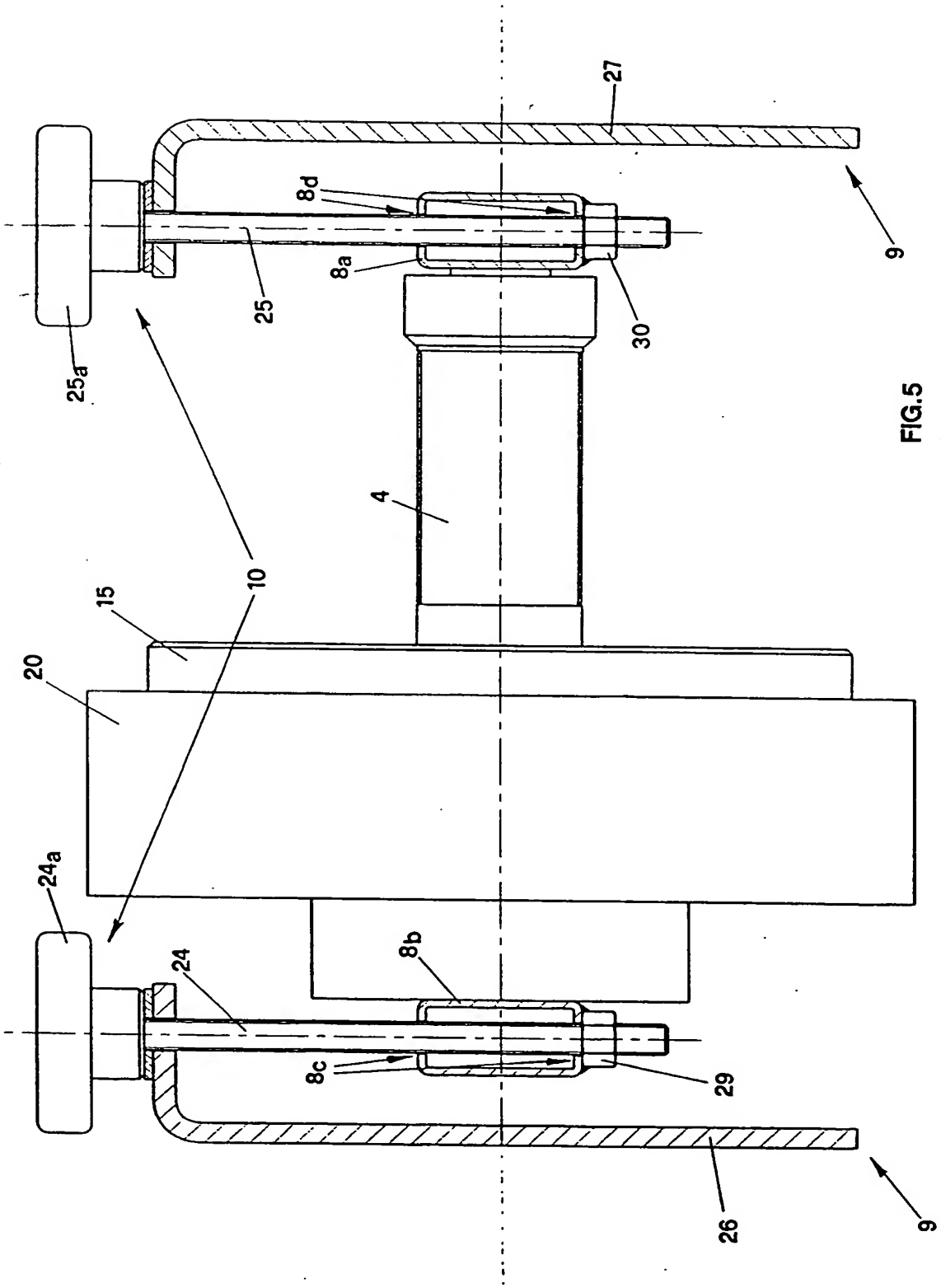


FIG.5

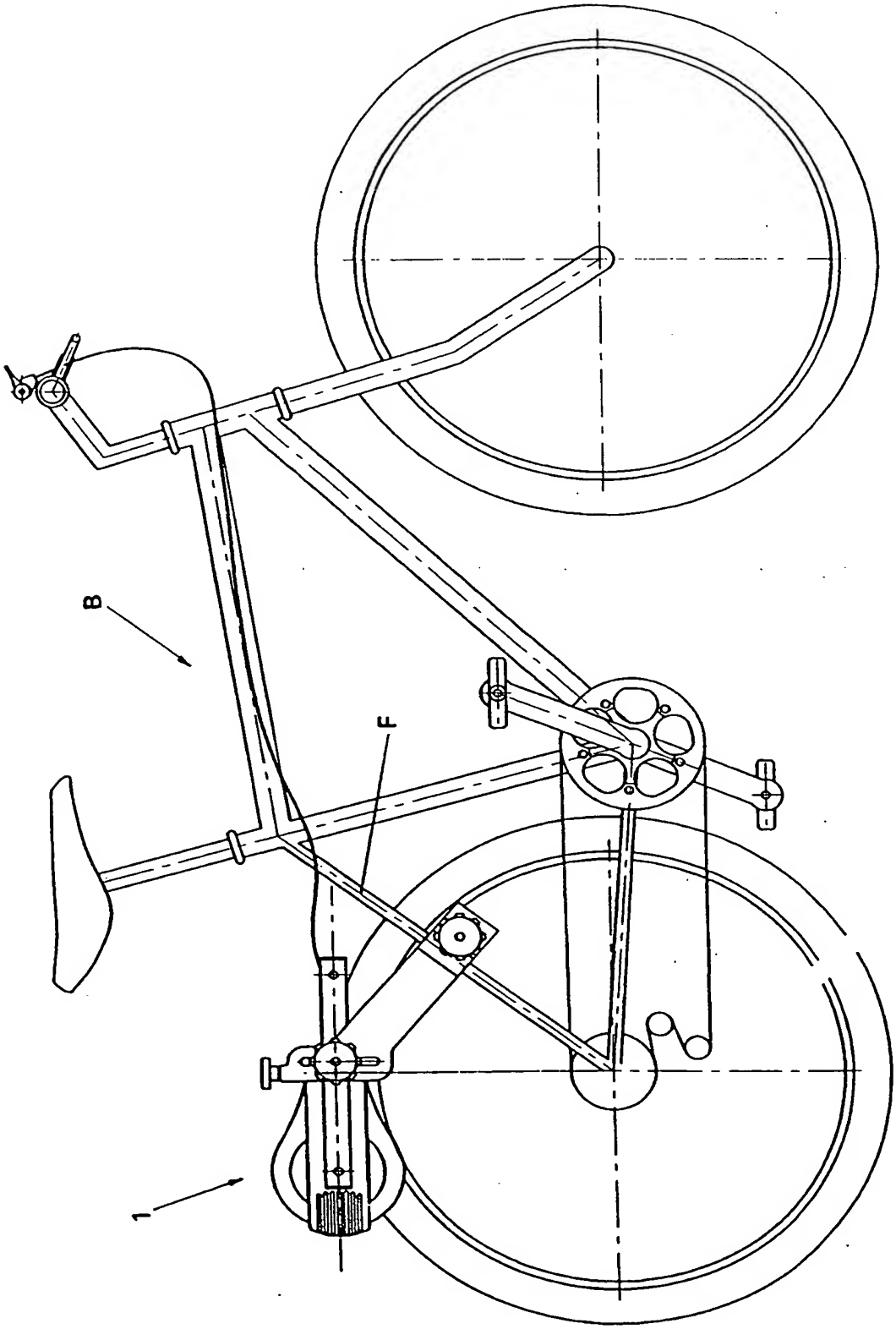


FIG.6

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
12 April 2001 (12.04.2001)

PCT

(10) International Publication Number
WO 01/24885 A3

(51) International Patent Classification[7]: A63B 69/16, 21/005

(21) International Application Number: PCT/IB00/01452

(22) International Filing Date: 29 September 2000 (29.09.2000)

(25) Filing Language: Italian

(26) Publication Language: English

(30) Priority Data:
VI99A000202 1 October 1999 (01.10.1999) IT

(71) Applicant *(for all designated States except US)*: GIST SNC DI PAROLIN LUIGI E CAMILLO & C. [IT/IT]; Via Ramon, 10, I-36028 Rossano Veneto (IT).

(71) Applicants and
(72) Inventors *(for CA, US only)*: PERUZZO, Massimo [IT/IT]; Via S. Pio X 44, I-36027 Rosà (IT). PAROLIN, Gilberto [IT/IT]; Via T. Zanon, 31, I-36028 Rossano Veneto (IT).

(74) Agent: BONINI, Ercole; Studio Ing. E. Bonini Srl, Corso Fogazzaro, 8, I-36100 Vicenza (IT).

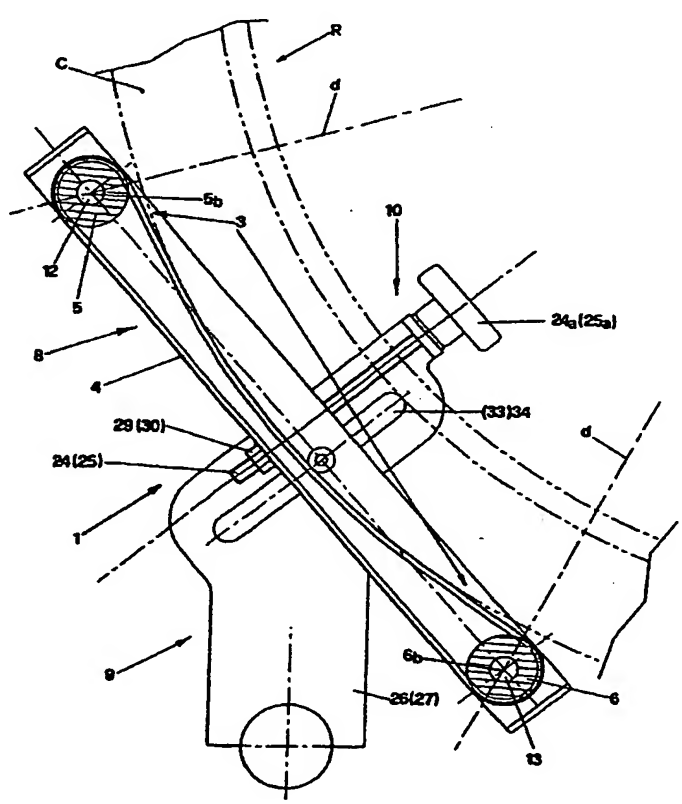
(81) Designated States *(national)*: AU, CA, US.

(84) Designated States *(regional)*: European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE).

Published:
— *With international search report.*
— *Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.*

[Continued on next page]

(54) Title: BRAKING UNIT FOR BICYCLES



(57) Abstract: Braking assembly (1) for bicycles (B) is disclosed, particularly suitable for training of cyclists, constrained to a support structure (2; F) and provided with braking means (3) cooperating with the driving wheel (R) of said bicycle (B) to generate a resisting torque opposing the rotation given by the cyclist to the driving wheel (R) through the pedals (P). The braking means (3) comprise a flexible belt (4) with mainly longitudinal development arranged with perimetral adherence to tyre (C) of the driving wheel (R) for at least a portion of its circumference and wound as a closed loop between at least a couple of revolving rollers (5, 6), one of said rollers being operatively connected to energy dissipation means (7).

WO 01/24885 A3

(88) Date of publication of the international search report:
7 June 2001

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

INTERNATIONAL SEARCH REPORT

Int. ional Application No
PCT/[illegible] 00/01452

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A63B69/16 A63B21/005

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A63B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 475 207 A (KEMPSON ARTHUR HENRY; WESTWOOD, MORRIS AND CO) 16 November 1937 (1937-11-16) page 2, line 48 -page 3, line 87; figures 1-4	1
A	US 5 916 067 A (MORASSE LIONEL) 29 June 1999 (1999-06-29) column 4, line 1 -column 6, line 16; figures 1-5	1-3,6,7, 9,14,15
A	US 5 382 208 A (HU HUI-HSIN) 17 January 1995 (1995-01-17) column 2, line 10 -column 3, line 11; figures 1-4	1,2,6, 10-12

-/--

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28 March 2001	04/04/2001

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Levert, C

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

Int. ional Application No
PCT/IB 00/01452

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	WO 91 08024 A (SCHUMACHER JEAN MICHEL) 13 June 1991 (1991-06-13) page 4, line 30 -page 6, line 34; figures 1-3,6	1

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

Int tional Application No
PCT/[redacted] 00/01452

Patent document cited in search report		[redacted]blication date	Patent family member(s)		Publication date
GB 475207	A		NONE		
US 5916067	A	29-06-1999	CA	2191921 A	03-06-1998
US 5382208	A	17-01-1995	NONE		
WO 9108024	A	13-06-1991	BE	1003439 A	24-03-1992